

## Novel High Pressure Pump-on-a-Chip Technology, Phase I

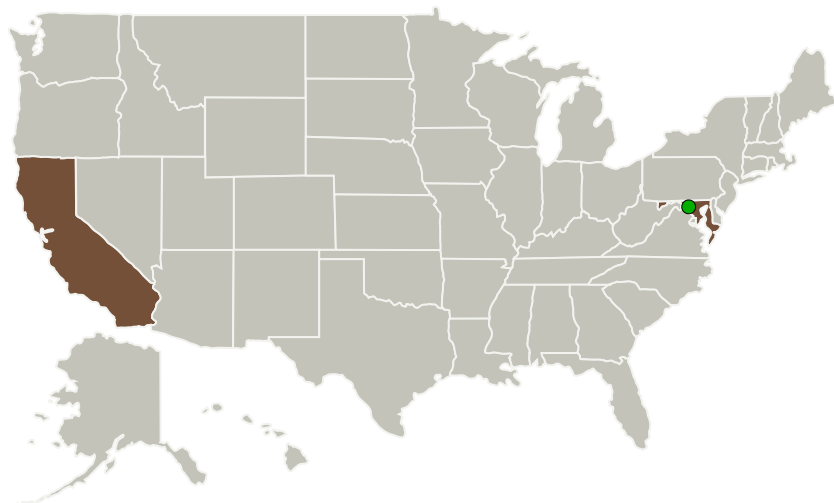
Completed Technology Project (2012 - 2012)



## Project Introduction

HJ Science & Technology, Inc. proposes to develop a novel high pressure "pump-on-a-chip" and "valve-on-a-chip" microfluidic technology for NASA planetary science applications including on-chip sample manipulation and analysis. In particular, we will design, build and demonstrate a miniature high pressure micropump to precisely control fluid flow in microfluidic devices with no moving parts. These micropumps are capable of achieving high pressures with low actuating voltages. Such high performance, small mass and volume, and low power consumption micropumps and microvalves are amenable for implementation at wafer level, ideally suited for chip-based HPLC and other "lab-on-a-chip" sample manipulation applications. For the Phase I effort, we will design, construct, and testing these micropumps. The Phase I research will address issues related to performance as well as production methods that can be used for the technology, as well as designing and determining the integrated micro-device and the Phase II prototype. In the Phase II effort, we will construct and test the final prototypes capable of integrating to HPLC chips and other microfluidic devices.

## Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
HJ Science & Technology, Inc.	Lead Organization	Industry Small Disadvantaged Business (SDB)	Berkeley, California
● Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

## Primary U.S. Work Locations

California	Maryland
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## Project Transitions

**February 2012:** Project Start**August 2012:** Closed out**Closeout Documentation:**

- Final Summary Chart(<https://techport.nasa.gov/file/140286>)

## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Organization:**

HJ Science &amp; Technology, Inc.

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

Carlos Torrez

**Principal Investigator:**

Hong Jiao

**Co-Investigator:**

Hong Jiao

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### Technology Maturity (TRL)

Start: **4**  
Current: **6**  
Estimated End: **6**



### Technology Areas

#### Primary:

- TX08 Sensors and Instruments
  - └ TX08.1 Remote Sensing Instruments/Sensors
    - └ TX08.1.4 Microwave, Millimeter-, and Submillimeter-Waves

### Target Destinations

Earth, The Moon, Others Inside the Solar System, Outside the Solar System, The Sun, Mars